Spot Safety Project Evaluation

Project Log # 200501241

Spot Safety Project # 04-97-218

**Spot Safety Project Evaluation, of the Flashing Traffic Signal Installation,
At the Intersection of SR 1717-Macedonia Rd-Sandy Cross Rd and SR 1001-Old Bailey Hwy
Nash County**

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

_____ 04/12/2005
Carrie L. Goodrich Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 04-97-218 – The Intersection of SR 1717-Macedonia Rd-Sandy Cross Rd and SR 1001-Old Bailey Hwy, Nash County

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis and an Odds Ratio comparison analysis has been completed to measure the effectiveness of the spot safety improvement. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of an overhead flashing traffic signal. A private citizen originally requested the improvement. Both SR 1717-Macedonia Rd-Sandy Cross Rd and SR 1001-Old Bailey Hwy are two-lane facilities with a speed limit of 55 mph at the treatment intersection. The subject location is controlled by dually posted stop signs on SR 1717-Macedonia Rd-Sandy Cross Rd. Drivers expect to maintain the right-of-way on all approaches of this intersection. In addition, motorists on SR 1001-Old Bailey Road have difficulty recognizing the traffic control that requires them to stop.

The initial crash analysis for this location was completed from May 1, 1990 through May 31, 1996 with a total of thirteen reported crashes. According to the initial crash analysis, there were eight Angle crashes, two Left Turn crashes, and two “Random in Nature” crashes, resulting in six class A injury, eight class B injuries, and nine class C injuries. It was felt that the installation of a flashing traffic signal would greatly reduce the accident potential at the treatment location by better identifying the existing traffic control devices. The final completion date for the improvement at the subject intersection was on November 17, 1999.

Comparison Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from September 1, 1999 through January 31, 2000. The before period consisted of reported crashes from March 1, 1995 through August 31, 1999 (4 Years, 6 Months) and the after period consisted of reported crashes from February 1, 2000 through July 31, 2004 (4 Years, 6 Months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The analysis also consisted of two different sets of data, the treatment and the comparison data. The treatment data consisted of all crashes within 150 feet of the subject intersection. The comparison data consisted of a sum of all crashes within 150 feet of eight intersections located near the treatment intersection. The intersections that comprise the comparison data are as follows:

SR 1717-Sandy Cross Rd at SR 1930-Baker Rd,
SR 1717-Sandy Cross Rd at SR 1756-E.P. Taylor Rd,
SR 1717-Sandy Cross Rd at SR 1929-SR 1932-Lindsay Rd,
SR 1717-Sandy Cross Rd at SR 1936-Land Rd,
SR 1717-Macedonia Rd at SR 1923-Tyson Loop Rd,
SR 1717-Macedonia Rd at SR 1919-Sheep Pasture Rd,
SR 1717-Macedonia Rd at SR 1918-Dalmar Rd, and
SR 1717-Macedonia Rd at SR 1917-Wiggins Rd

Please see attached *Location Map* for further detail. The following data table depicts the Naive Before and After Analysis for the treatment and comparison intersections. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

Treatment Information

	Before	**After**	**Percent Reduction (-)/ Percent Increase (+)**
Total Crashes	10	10	0.0
Total Severity Index	19.12	13.02	- 31.9
Frontal Impact Crashes	10	8	- 20.0
Frontal Severity Index	19.12	15.10	- 21.0
Volume	3600	4200	16.7

Comparison Information

	Before	**After**	**Percent Reduction (-)/ Percent Increase (+)**
Total Crashes	12	12	0.0
Total Severity Index	10.40	4.08	- 60.8
Frontal Impact Crashes	2	7	250.0
Frontal Severity Index	38.90	4.17	- 89.3
Volume	1900	1700	- 10.5

Odds Ratio: Treatment versus Comparison

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Treatment Total Crashes	10	10	---
Comparison Total Crashes	12	12	0.0 %

The naive before and after analysis at the treatment location resulted in a 0.0 percent decrease in Total Crashes, a 31.9 percent decrease in the Total Severity Index, and a 16.7 percent increase in Average Daily Traffic (ADT). The comparison locations experienced a 0.0 percent decrease in Total Crashes, a 60.8 percent decrease in the Total Severity Index, and a 10.5 percent decrease in ADT. The before period ADT year was 1997 and the after period ADT year was 2002.

The Odds Ratio is used as another means of calculating the treatment effect. The number of crashes in the before and after period from the Comparison are used to calculate the percent reduction in crashes for the Treatment Intersection. As shown in the previous table, using the Odds Ratio calculation, there is a 0.0 percent decrease in Total Treatment Intersection crashes.

Results and Discussion

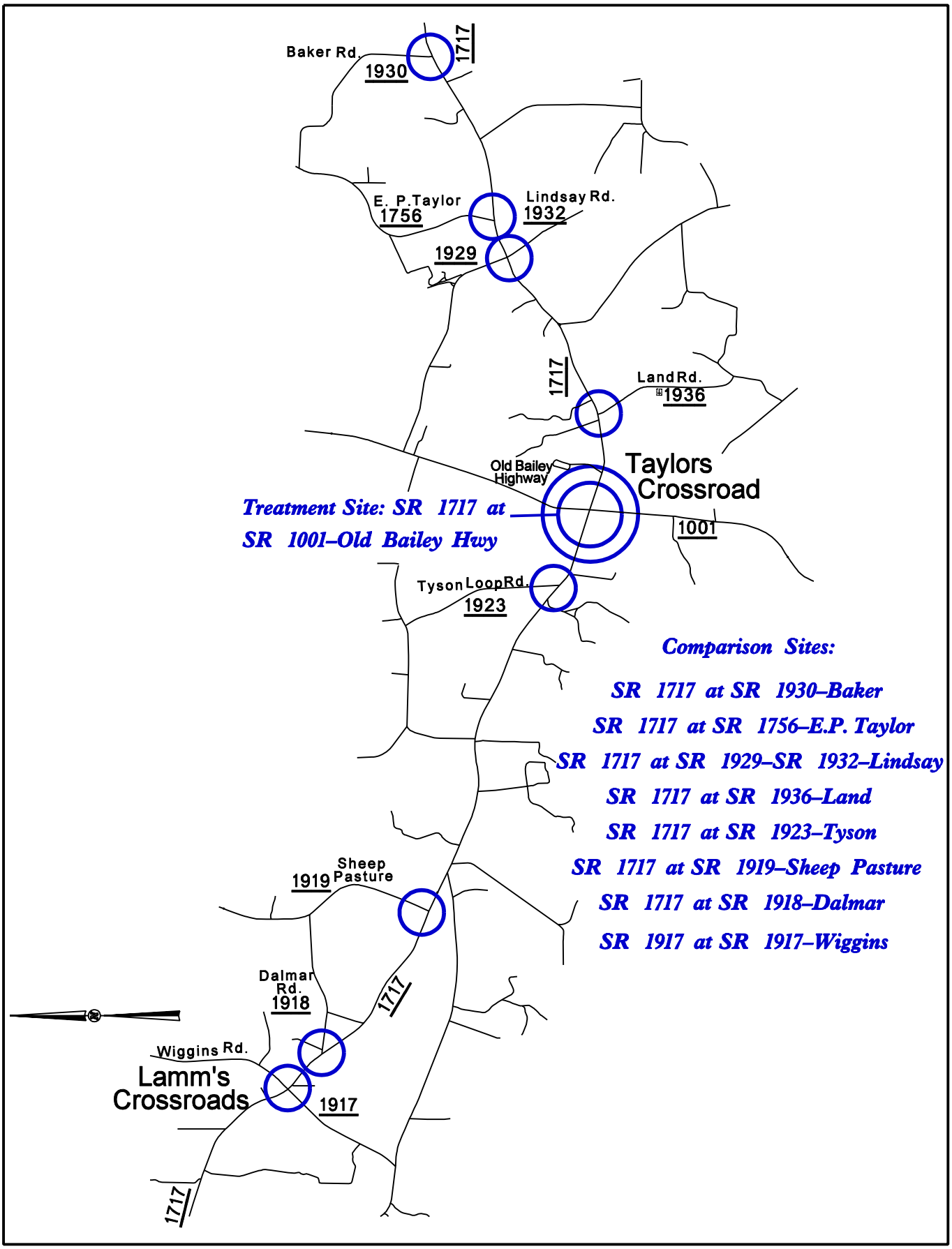
The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 0.0 percent decrease in Total Crashes and a 20.0 percent decrease in Frontal Impact Crashes. Using the Odds Ratio to calculate the treatment effect resulted in a 0.0 percent decrease in Total Crashes at the Treatment Intersection. The summary results above demonstrate that the treatment location appears to have had no change in the number of Total Crashes and a decrease in the number of Frontal Impact Crashes from the before to the after period.

Please see the attached Treatment Site Photos. Photos are provided for each leg of the intersection. Notice that there are no stop bars on either approach of SR 1717-Shady Cross Rd-Macedonia Rd at the intersection. In addition, no advance warning signs are located on the SR 1717-Shady Cross Rd-Macedonia Rd approaches.

The countermeasure crash reduction for Total Crashes at the subject intersection is a 0.0 percent decrease in crashes. The countermeasure crash reduction for Frontal Impact Crashes at the subject intersection is a 20.0 percent decrease in crashes. As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors.

Evaluation of Spot Safety Project Number 04–97–218

Location Map, Nash County



location map.dgn 11/17/2005 05:03:02 PM

Treatment Site Photos (Taken on February 12, 2005)

Looking north on SR 1001-Old Bailey Rd

Looking south on SR 1001-Old Bailey Rd

Treatment Site Photos (Taken on February 12, 2005)

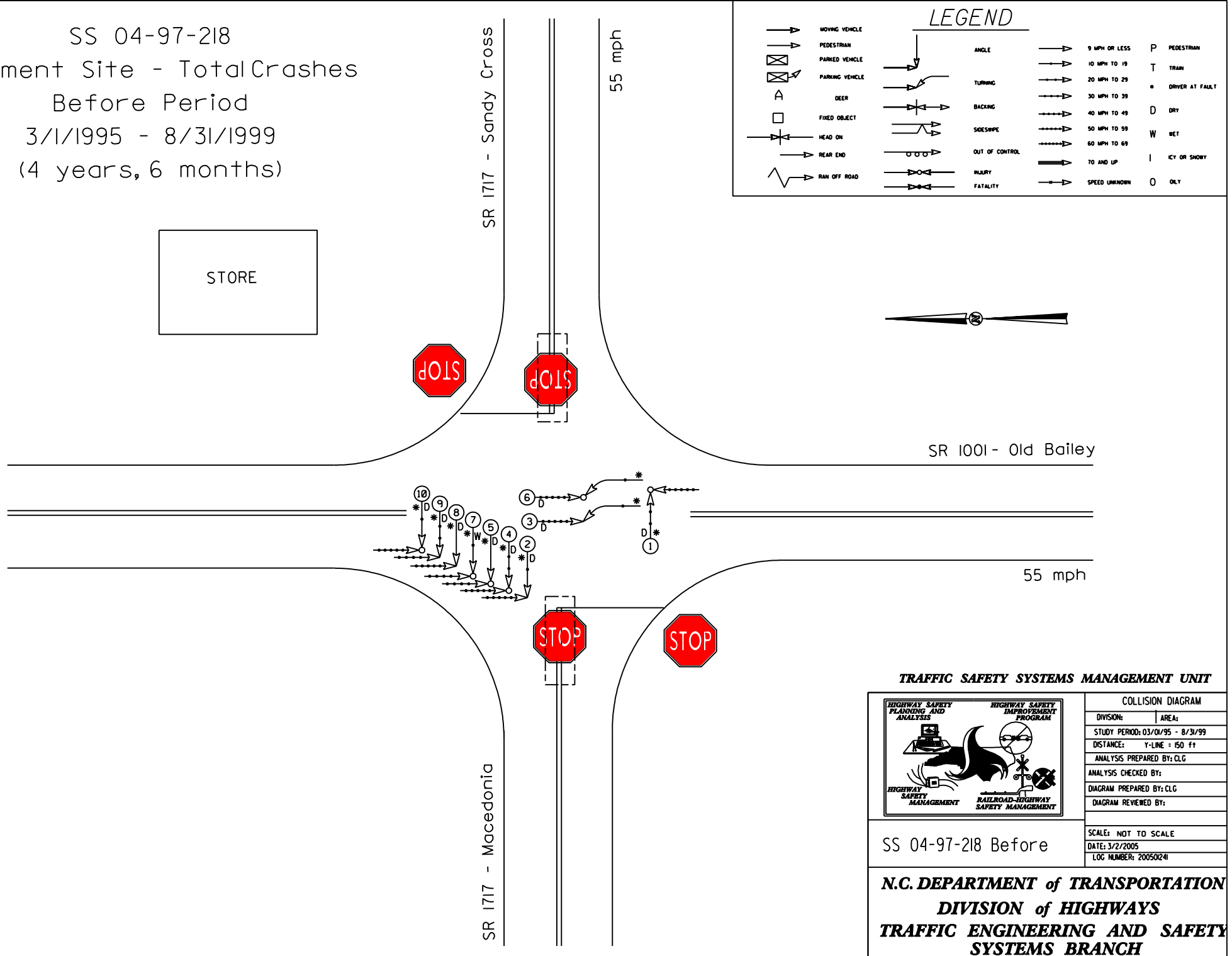
Looking east on SR 1717-Macedonia Rd

Looking west on SR 1717-Sandy Cross Rd
Notice the absence of stop bars on both SR 1717 approaches.
Also note the lack of commercial channelization in the northeast quadrant.

Treatment Site Photos (Taken on February 12, 2005)

Photo taken while driving west toward the Treatment Intersection.
Notice the absence of Advance Warning signage.

SS 04-97-218
Treatment Site - Total Crashes
Before Period
3/1/1995 - 8/31/1999
(4 years, 6 months)



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY PLANNING AND ANALYSIS
HIGHWAY SAFETY IMPROVEMENT PROGRAM
HIGHWAY SAFETY MANAGEMENT
RAILROAD-HIGHWAY SAFETY MANAGEMENT

COLLISION DIAGRAM

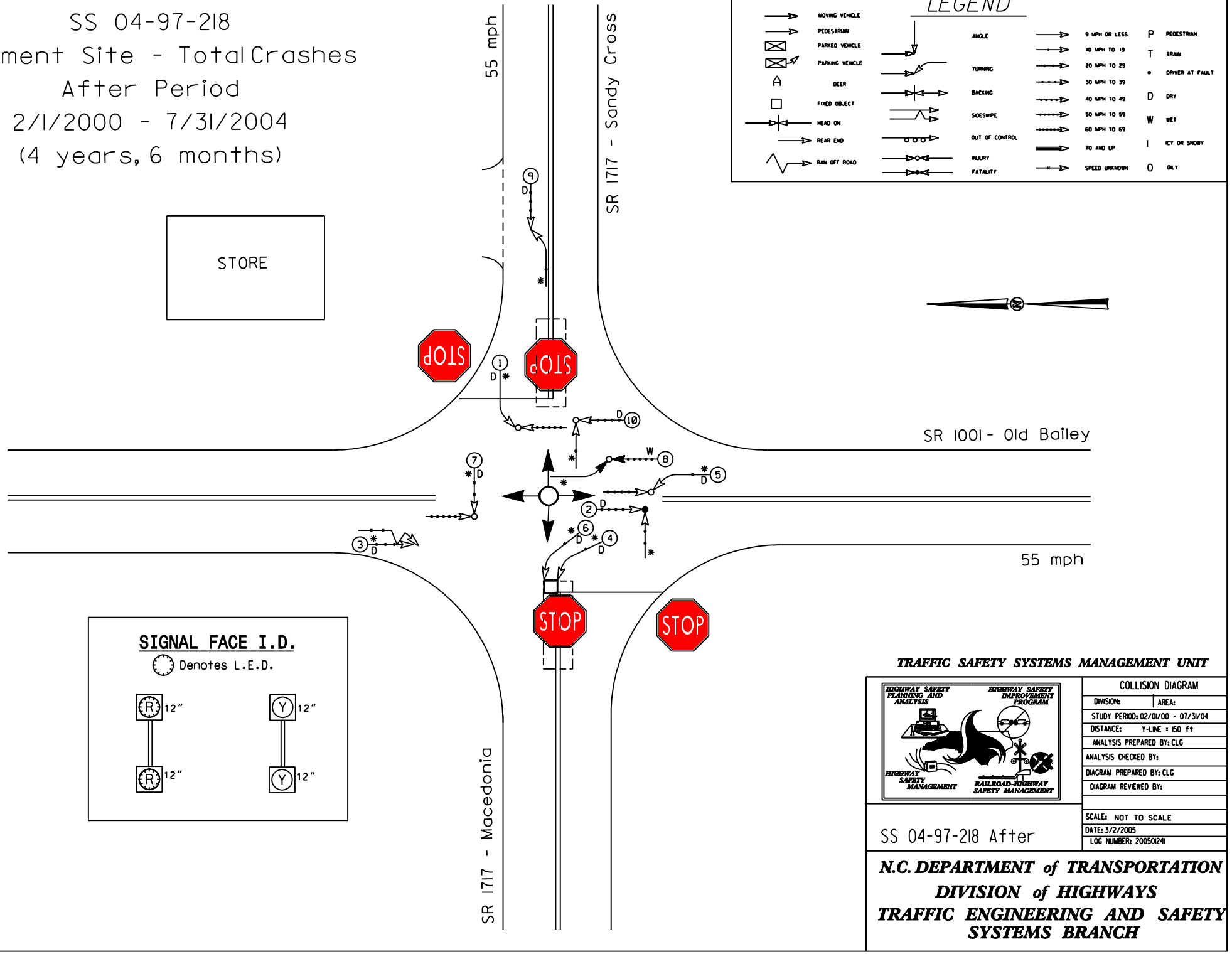
DIVISION:	AREA:
STUDY PERIOD: 03/01/95 - 8/31/99	
DISTANCE: Y-LINE = 150 ft	
ANALYSIS PREPARED BY: CLG	
ANALYSIS CHECKED BY:	
DIAGRAM PREPARED BY: CLG	
DIAGRAM REVIEWED BY:	
SCALE: NOT TO SCALE	
DATE: 3/2/2005	
LOG NUMBER: 20050124I	

SS 04-97-218 Before

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

collisiondiagram.dgn 11/17/2005 05:05:46 PM

SS 04-97-218
Treatment Site - Total Crashes
After Period
2/1/2000 - 7/31/2004
(4 years, 6 months)



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
DEER
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN

P PEDESTRIAN
T TRAIN
* DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY
O OILY

SIGNAL FACE I.D.

Denotes L.E.D.

R 12" Y 12"
R 12" Y 12"

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY PLANNING AND ANALYSIS
HIGHWAY SAFETY IMPROVEMENT PROGRAM
HIGHWAY SAFETY MANAGEMENT
RAILROAD-HIGHWAY SAFETY MANAGEMENT

COLLISION DIAGRAM

DIVISION: AREA:
STUDY PERIOD: 02/01/00 - 07/31/04
DISTANCE: Y-LINE = 150 ft
ANALYSIS PREPARED BY: CLG
ANALYSIS CHECKED BY:
DIAGRAM PREPARED BY: CLG
DIAGRAM REVIEWED BY:

SCALE: NOT TO SCALE
DATE: 3/2/2005
LOG NUMBER: 20050241

SS 04-97-218 After

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

collisiondiagram.dgn 11/17/2005 05:06:28 PM